Hadronic Calorimeter Prototype2 Simulation Update

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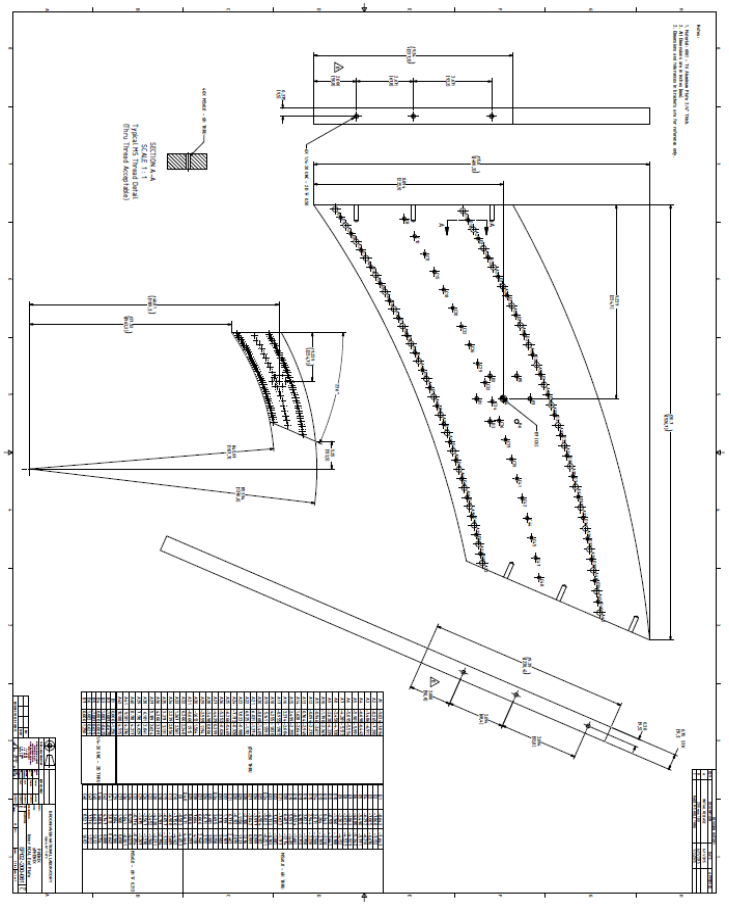
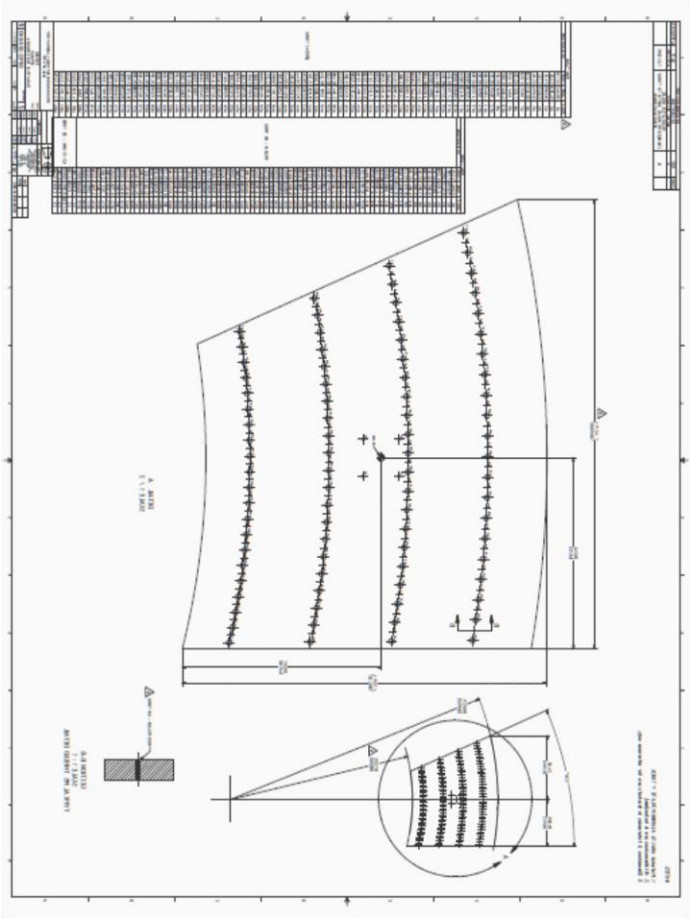
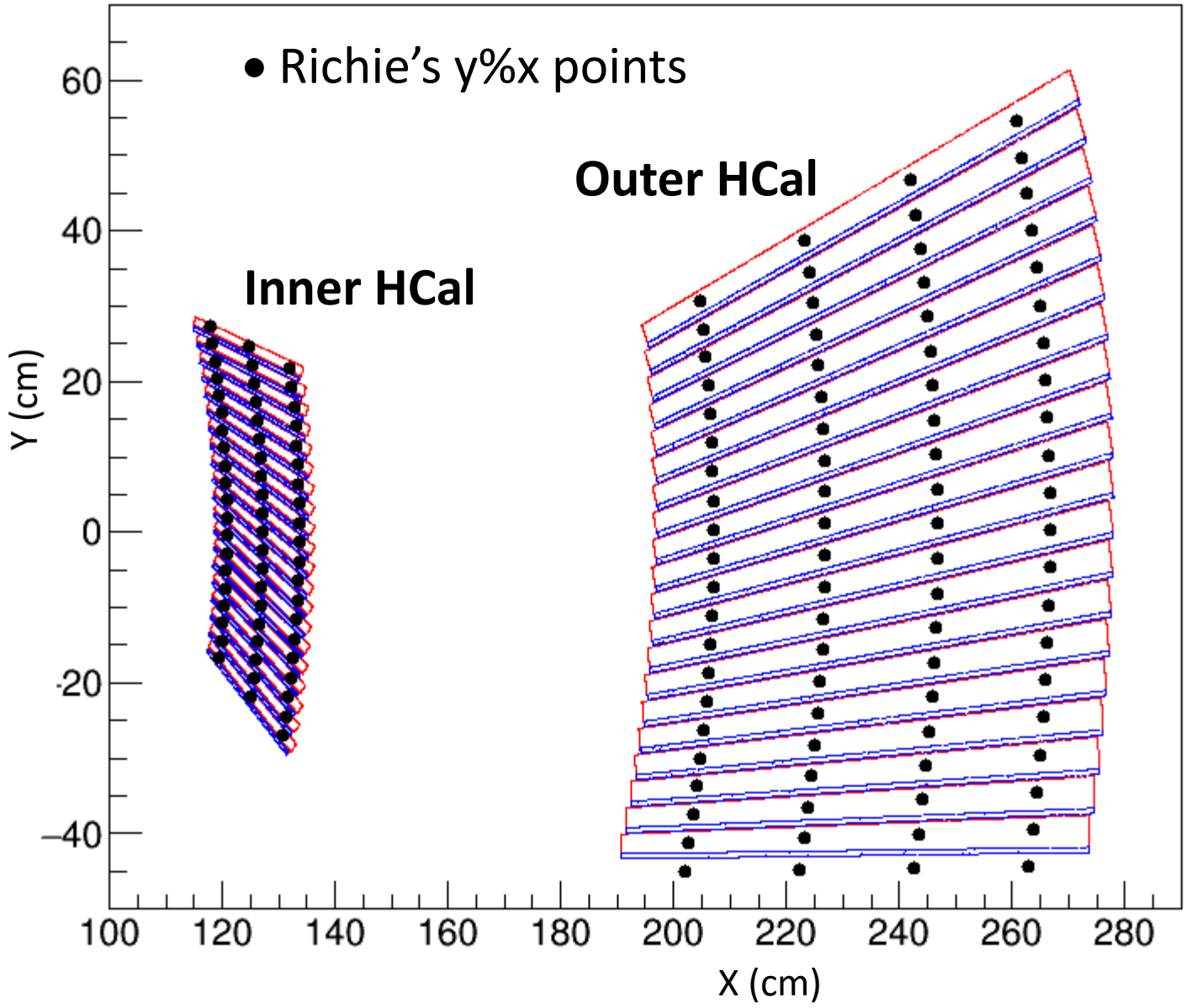
Richie's Design Drawings

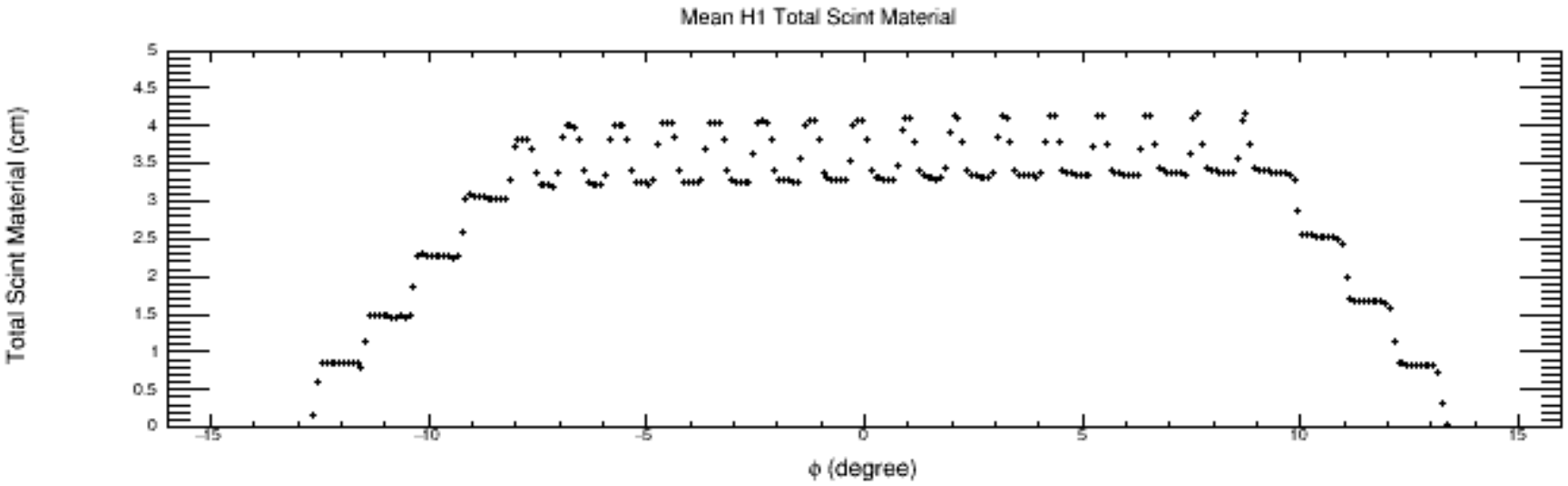


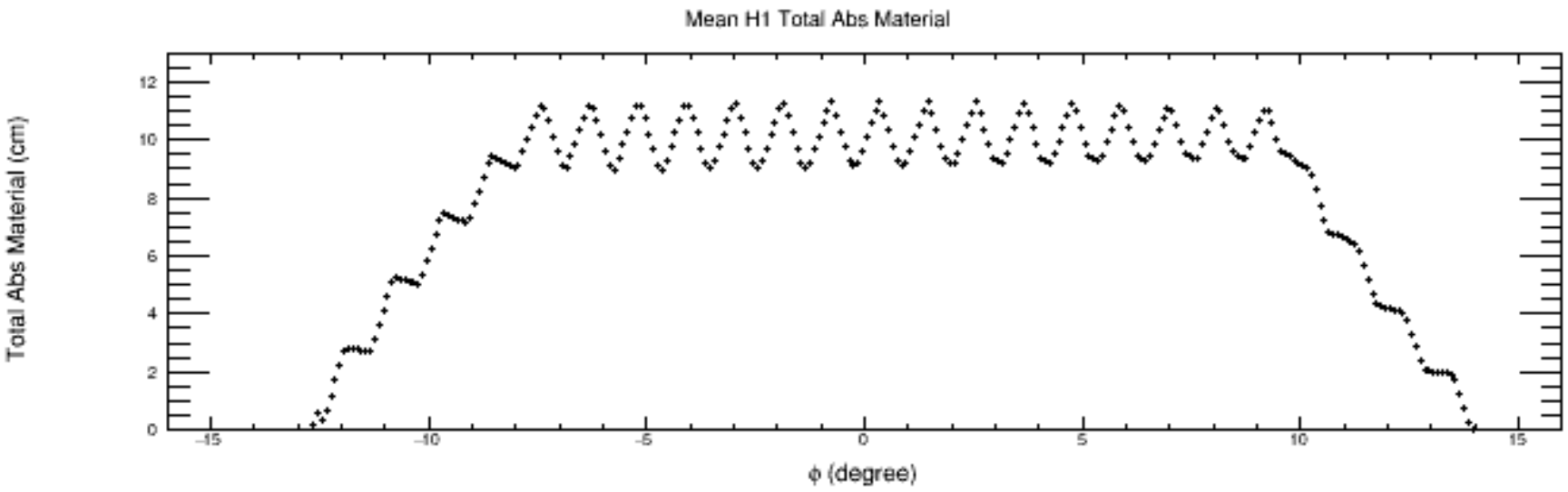


GEANT4 Simulations

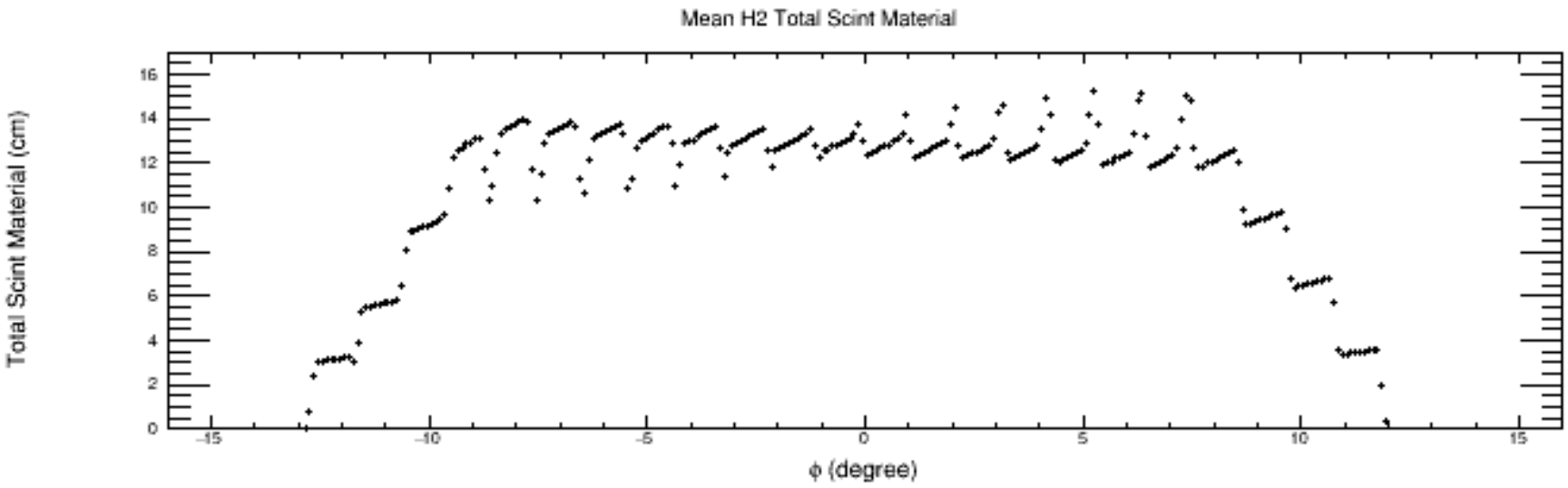


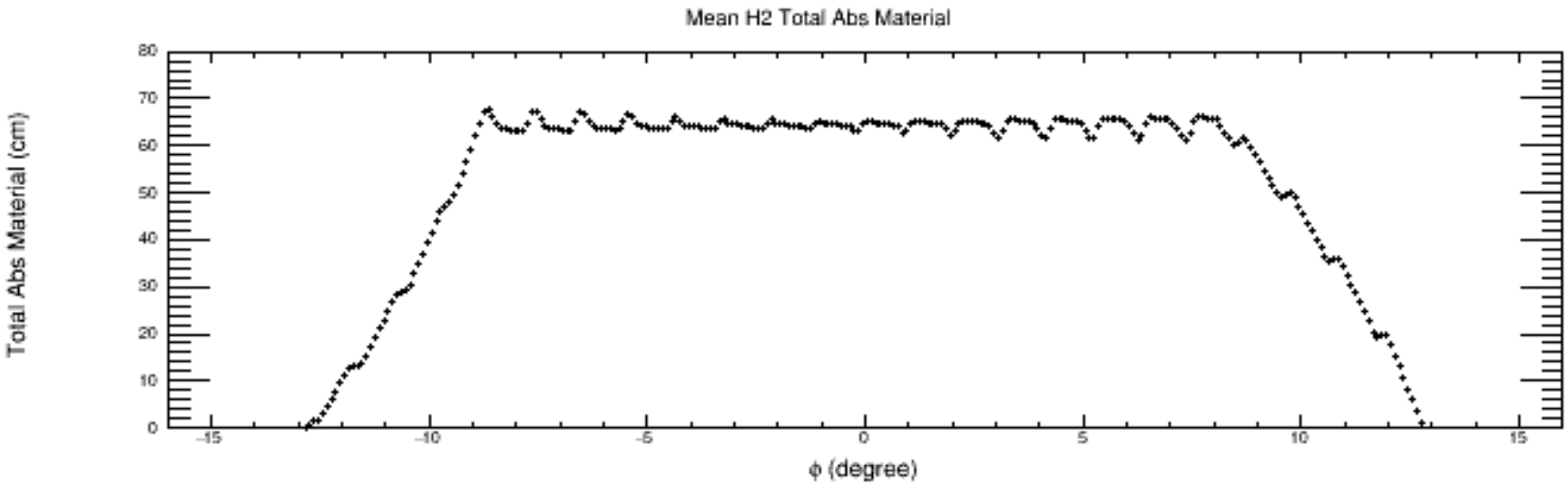
Material Scan w/ GEANTINOS / Inner HCal



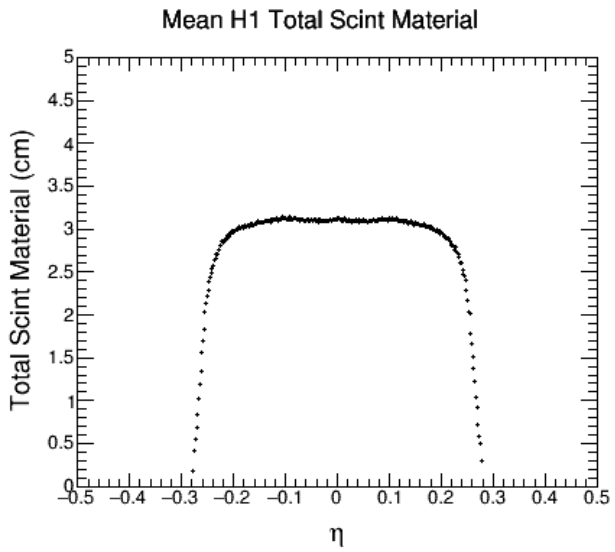


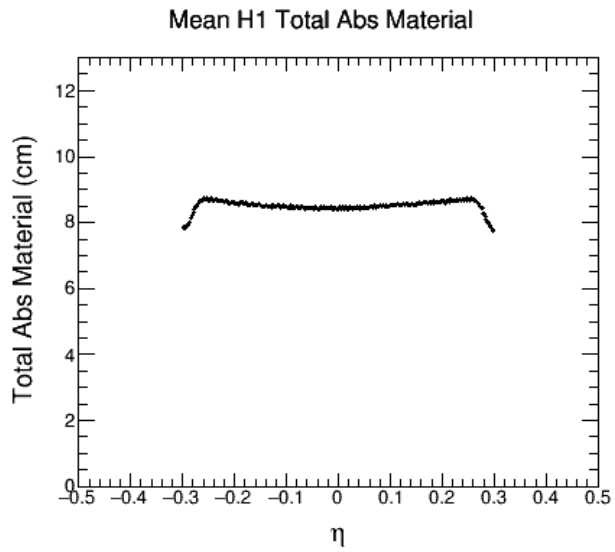
Material Study w/ GEANTINOS / Outer HCal

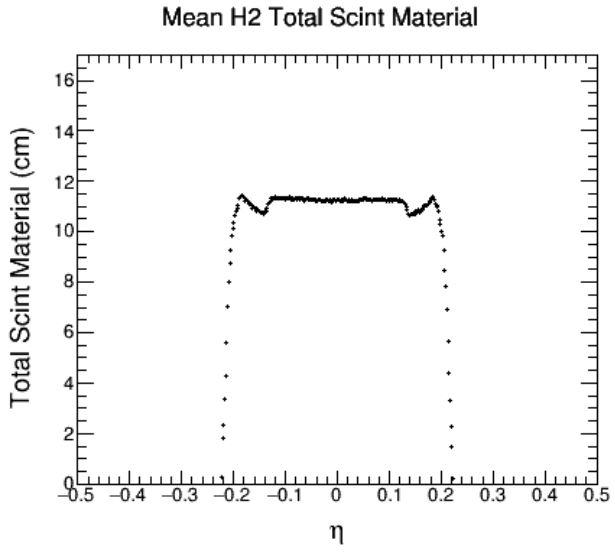


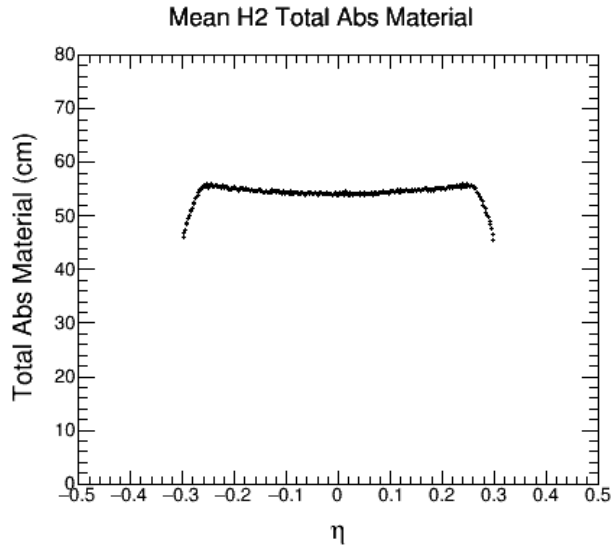


Material Study w/ GEANTINOS









Simulation Parameters

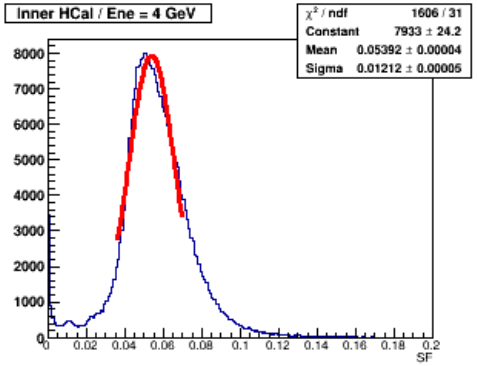
- Magnetic field = 0 T
- Generated $\mu^{\pm}$, $e^{\pm}$ and $\pi^{\pm}$ at 4, 8, 16, 25, 32, 40, 50, 60 GeV
- $|\eta| < 0.3$ & $|\varphi| < 30°$

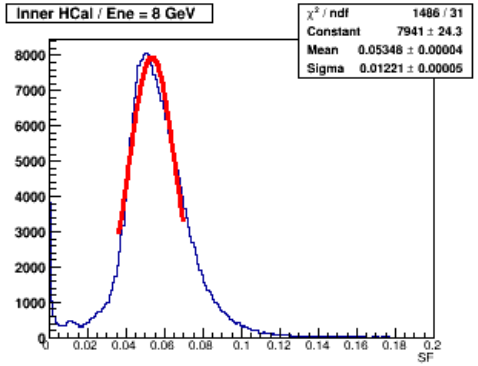
$$\text{Sampling Fraction } (SF) = \frac{E_{scint}}{E_{scint} + E_{abs}}$$

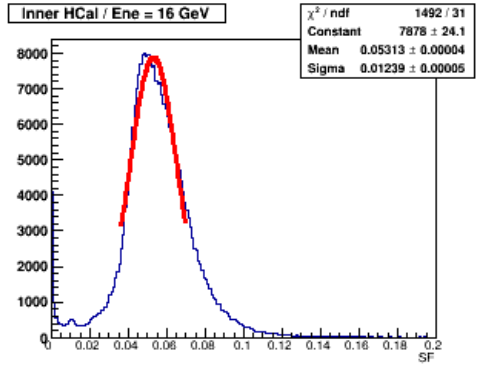
$$\text{Energy Asymmetry } (E_{Asy}) = \frac{E_{H1} - E_{H2}}{E_{H1} + E_{H2}}$$

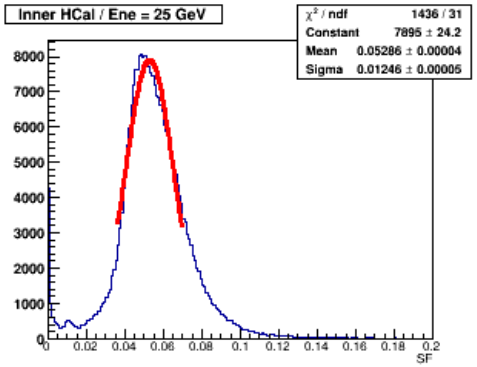
where E_{H1}, and E_{H2} are the scintillator energy in the inner and the outer Hcal prototype, respectively.

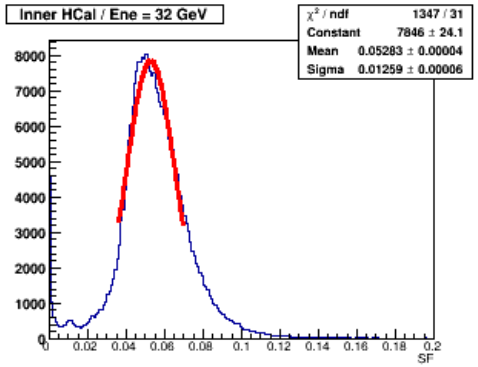
Sampling Fraction / Inner HCal

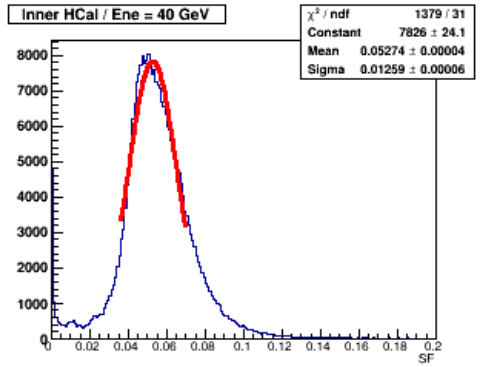


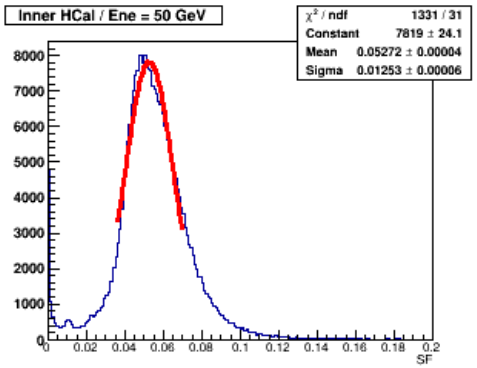


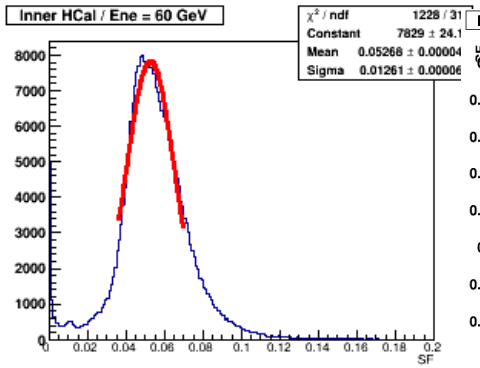


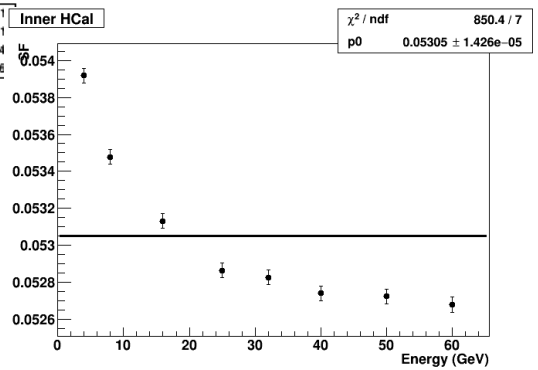




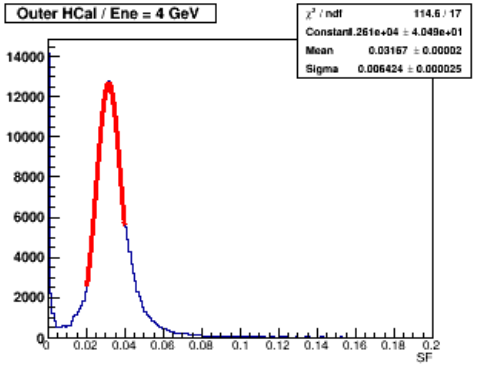


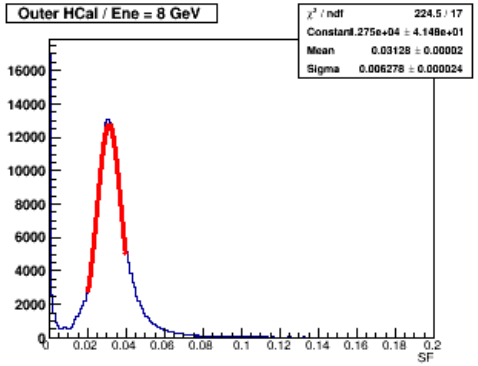


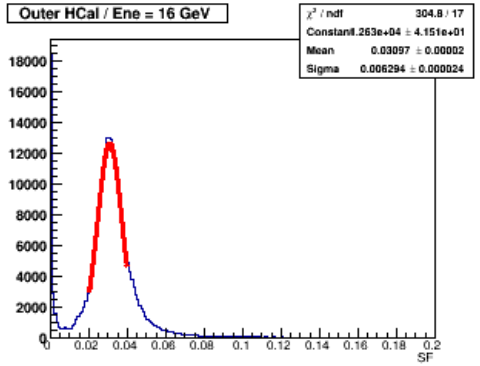


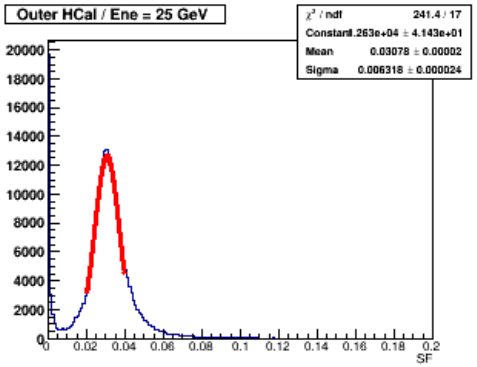


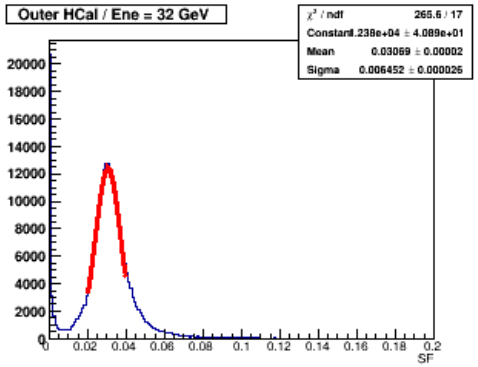
Sampling Fraction / Outer HCal

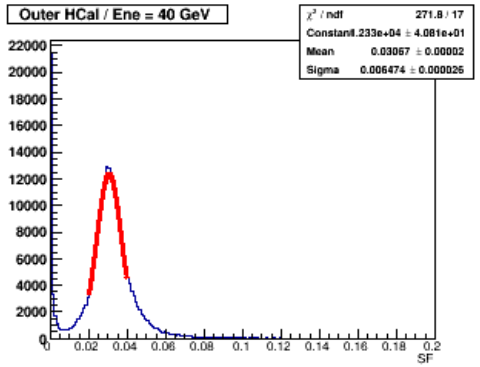


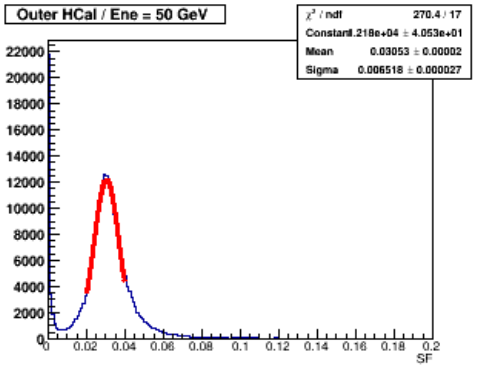


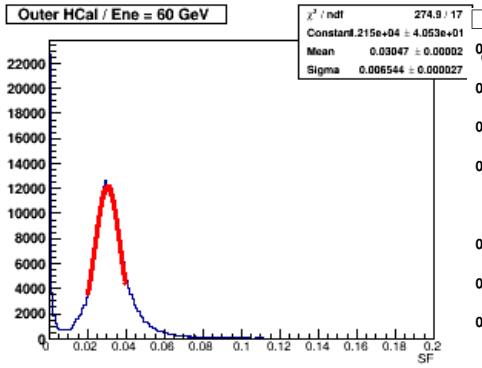


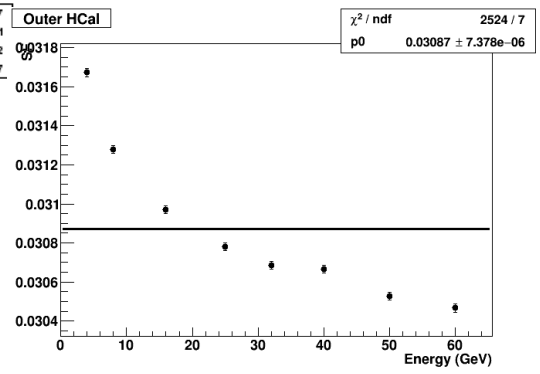






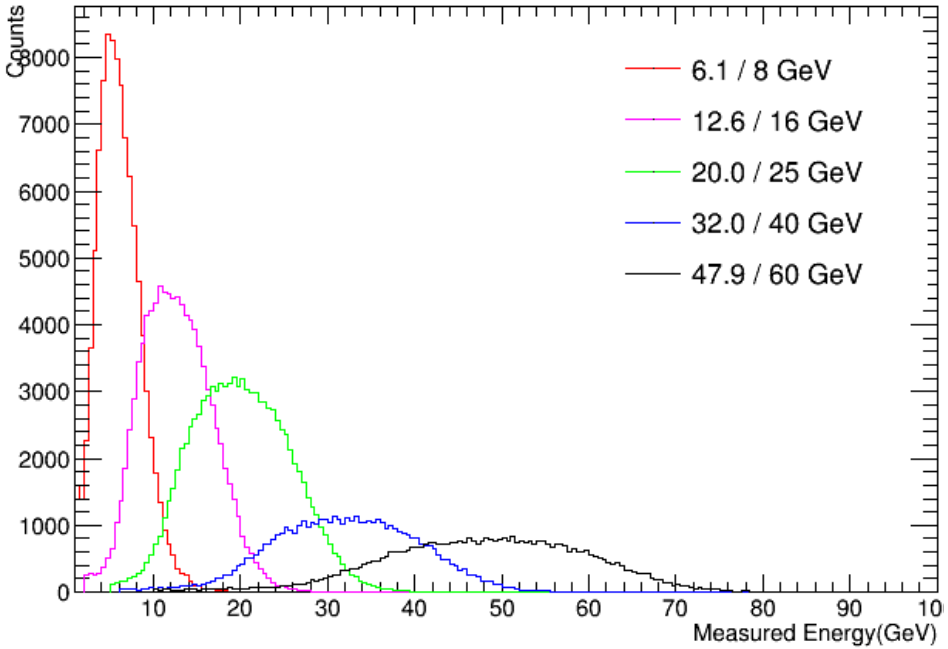




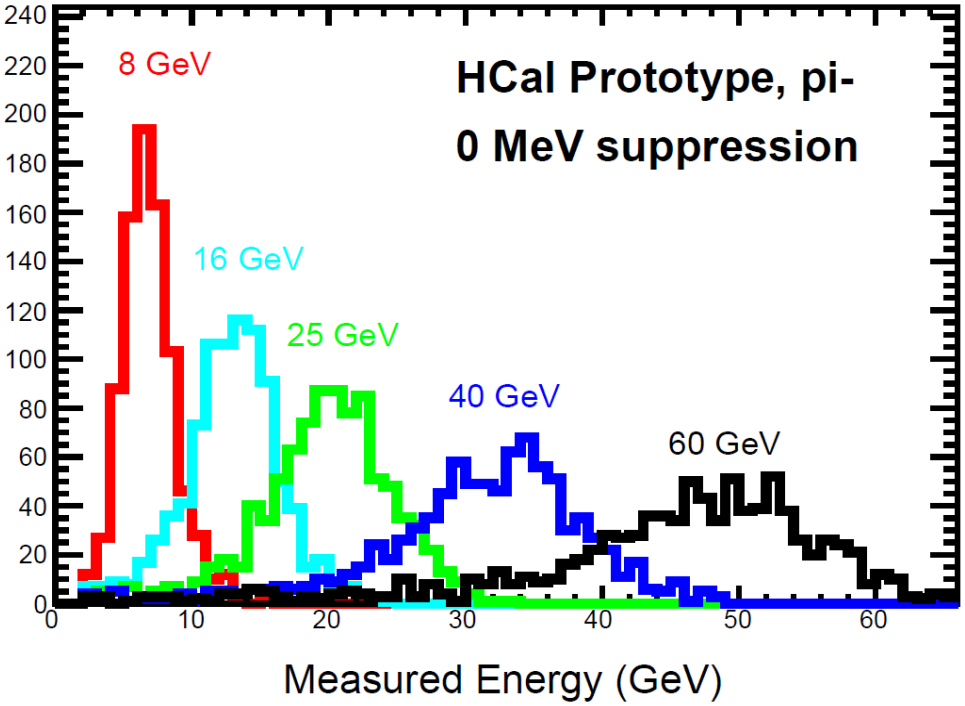


Total Reconstructed Energy / π^-

Prototype2

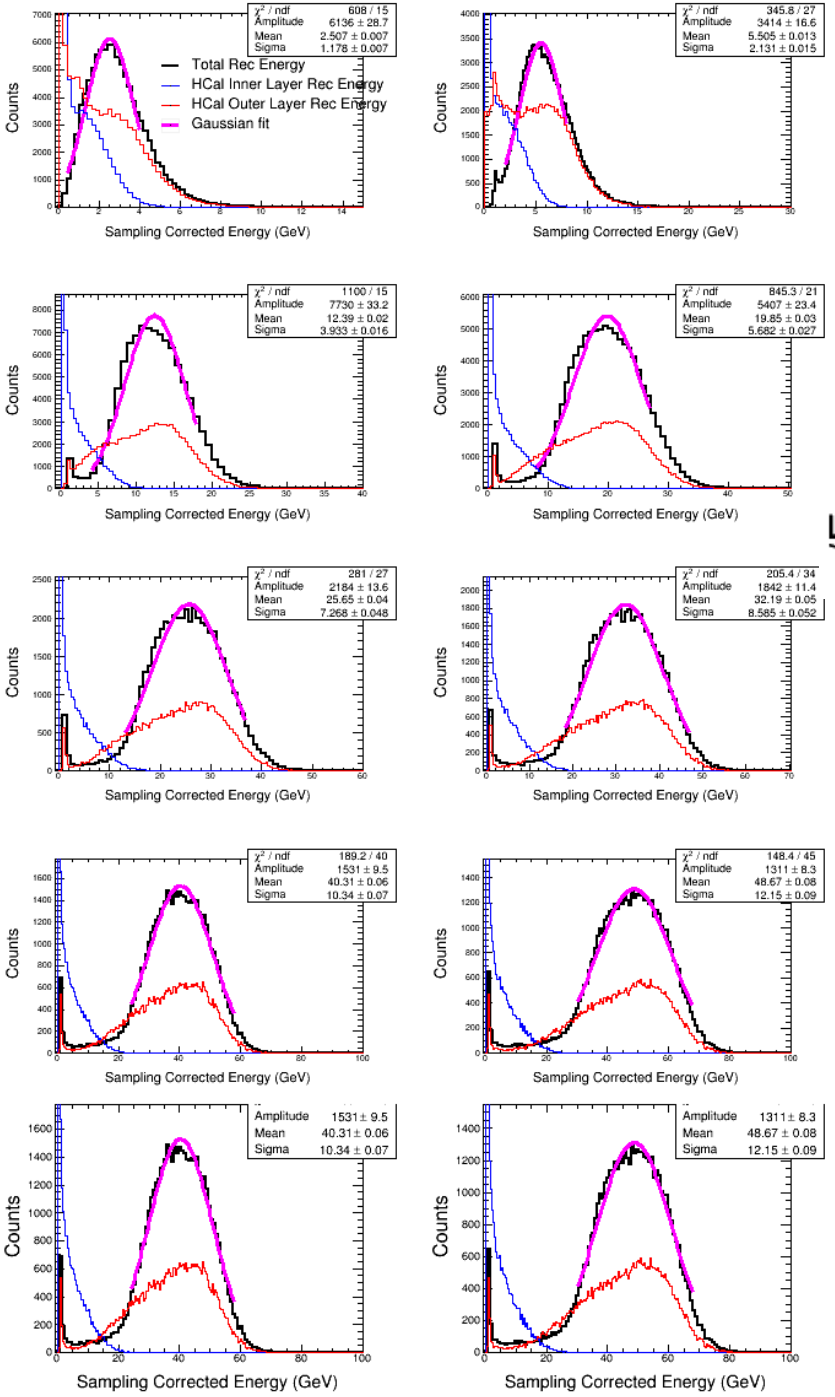


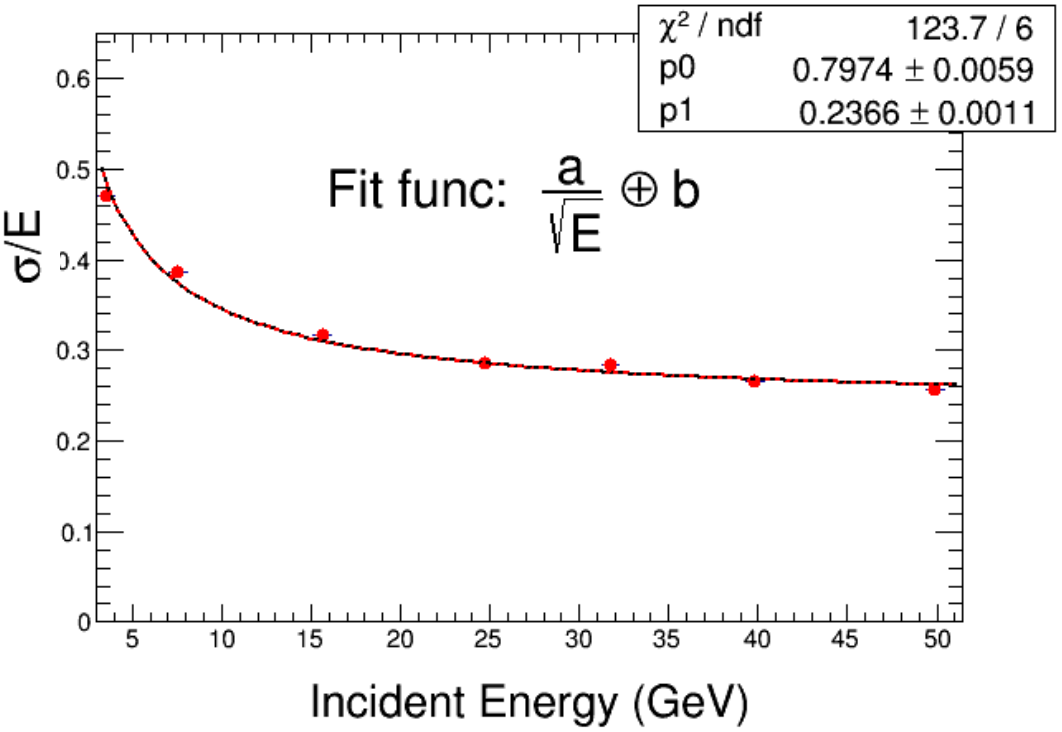
Prototype1



Energy Resolution / π^-

- Zero threshold applied on towers





Total Rec Energy
HCal Inner Layer Rec Energy
HCal Outer Layer Rec Energy
Gaussian fit

To Do …

- Rerun e- and look at the reconstructed energy
- Complete energy resolution & linearity

  (may be apply thresholds on the assigned towers)
- Look into energy asymmetry
- Extract e/π ratio

- Change the beam direction to simulate cosmics